

EXHIBIT D ADDENDUM

acid rain rain with pH values < about 5; commonly results from ACIDS formed by POLLUTANTS.^{171,172} (IUPAC)

"Pure" rain water equilibrated with atmospheric CO₂ and naturally occurring acids in relatively clean air usually has a pH > 5.

acid refined linseed oil LINSEED OIL which has been treated with ACID, usually sulfuric, to remove MUCILAGINOUS matter.^{63,156}

acid resistance ability of materials to resist attack by ACIDS; generally, the acids concerned are MINERAL ACIDS.⁷²

acid sludge residue which separates from mineral and related OILS when they are refined with sulfuric acid.¹⁴⁴

acid value see ACID NUMBER (VALUE).¹⁵⁷

acidity (1) measure of the free acid present; (2) in OILS, acidity denotes the presence of acid-type constituents whose concentrations are usually defined in terms of the NEUTRALIZATION NUMBER, called ACID NUMBER.^{144,157}

acoustic coating coating which absorbs or deadens sound.^{71,163} See ANTINOISE PAINTS.^{71,163}

acoustical board a low-density, sound-absorbing structural INSULATING board having a factory-applied finish and a fissured, felted-fiber, slotted or perforated surface pattern provided to reduce sound reflection.^{75,159,82} (ASTM)

These are usually supplied for use in the form of tiles.

acoustical ceiling board an ACOUSTICAL MATERIAL in board form, designed primarily for suspended ceiling application.^{75,82} (DAC)

acoustical material any material considered in terms of its acoustical properties.^{75,159} (ASTM)

Commonly, and especially, a material designed to absorb sound.

acoustical paint see ANTINOISE PAINTS and ACOUSTIC COATING.^{71,163}

acoustical plaster a special low-density, sound absorptive plaster, applied in the form of a finish-coat, to provide a continuous finished surface.^{73,82,75} (DAC)

acoustical tile an ACOUSTICAL MATERIAL in board form, usually having unit dimensions of 24 in. x 24 in. (approx. 61 cm x 61 cm) or less.^{82,75} (DAC)

Usually used on ceilings but also may be applied to sidewalls.

acrolein CH₂ = CHCHO. UNSATURATED LIQUID ALDEHYDE with a bp of 52°C.^{141,144}

It possesses a very pungent odor, and has strong lachrymatory properties.

acrolein polymers and resins HOMOPOLYMERS OR COPOLYMERS OF ACROLEIN.¹³⁰

acrylate ester formed from ACRYLIC ACID.⁷¹

The term also applies to the metallic salts of this acid.

acrylate resins see ACRYLICS.^{38,71,130}

acrylic acid CH₂ = CHCOOH. Propenoic acid, vinylformic acid. A MONOMER used in the manufacture of coatings and plastics.¹⁴¹

Properties: mol wt, 72.06; mp, 14°C; bp, 141.0°C; sp gr, 1.422.

acrylic ester ESTER of ACRYLIC ACID, or of a structural derivative of acrylic acid, such as METHACRYLIC ACID.¹⁴⁴

acrylic latex AQUEOUS DISPERSION, THERMOPLASTIC OR THERMOSETTING, of POLYMERS OR COPOLYMERS of ACRYLIC ACID, methacrylic acid, esters of these acids, or ACRYLONITRILE.^{130,156}

acrylic plastics THERMOPLASTIC OR THERMOSETTING PLASTICS of POLYMERS OR COPOLYMERS of ACRYLIC ACID, methacrylic acid, esters of these acids, or acrylonitrile.^{38,130}

acrylics RESINS resulting from the POLYMERIZATION of derivatives of ACRYLIC ACIDS, including esters of acrylic acid, methacrylic acid, acrylonitrile, and their copolymers.^{38,71,130} Syn: acrylic resins, and acrylate resins

acrylide maroon this group includes the AZO PIGMENTS based on acrylides of beta hydroxyl naphthoic acid (e.g., toluidine maroon); they are characterized by their excellent SOAP, ACID, and alkali resistance and good bake resistance.⁴¹ See ALKALI-RESISTANT RED.⁴¹

POOR BLEED RESISTANCE in aromatic and ALCOHOL SOLVENTS, POOR LIGHTFASTNESS in other than MASSTONE shades (including metallics), low HIDING POWER, and high cost discourage their use except where chemical resistance requirements demand; to this extent, they may be considered as specialty pigments.

acrylonitrile CH₂ = CHCN. A raw material for the manufacture of synthetic RESINS and RUBBERS.^{141,144} Syn: vinyl cyanide

It is a liquid at room temperature, with a bp of 77°C and an flp of 0°C.

acrylonitrile-butadiene-styrene (ABS) ACRYLONITRILE and STYRENE liquids and BUTADIENE gas polymerized together in a variety of ratios to produce the family of ABS resins.^{38,130}

ACS abbreviation for AMERICAN CHEMICAL SOCIETY.¹⁷⁴

exposure limits the concentration in workplace air of a chemical thought acceptable.¹⁷² See MAXIMUM ALLOWABLE CONCENTRATION.¹⁷²

This means that most workers can be exposed at the given levels or lower without harmful effects. The exposure limits in common use are (1) TLV-TWA (threshold limit value - time-weighted average); (2) STEL (short-term exposure limit) or STEV (short-term exposure value); (3) C (ceiling value).

exposure rack a frame on which test panels are exposed for DURABILITY TESTS.^{154,157} See TEST FENCE.^{154,157}

exposure tests tests which are conducted to evaluate the DURABILITY of a coating or film.¹⁵⁷

They include exposure to ultraviolet light, moisture, cold, heat, salt water, mildew, etc. They can be generated either naturally or artificially.

ASTM test methods for exposure tests include: house paints on new wood, D1006; paints on steel surfaces, D1014, D5065; quantifying dirt collection, D3719; recording results on standard forms, D1150; wood panel substrates, D358.

expression removal of a liquid from a solid by pressing, as in the manufacture of VEGETABLE OILS from meal cakes.^{63,131}

extender (1) see EXTENDER (PIGMENT).^{58,41} (2) A TRANSPARENT OR SEMITRANSSPARENT white PIGMENT or a VARNISH that is used to alter the COLOR STRENGTH and working properties of an INK, without affecting its HUE. However, in FLAT paints, when used properly they can impart DRY HIDING and help spacing of TITANIUM DIOXIDE. Also, air voids in CALCINED CLAYS help hiding.¹⁶⁸

The word EXTENDER has a pejorative connotation, however, it is true that they can be used to cheapen coatings. Their use is, however, invaluable in imparting desirable specific properties: aid SANDING, control SHEEN levels, improve ABRASION and BURNISHING resistance, affect RHEOLOGY, reinforce the film and increase BUILD and filling, and, as described above, contribute to hiding of flat paints.

Extenders can be conveniently divided into four groups: SULFATES—barytes and blanc fixe (both barium sulfates), GYPSUM (calcium sulfate); CARBONATES—whiting (calcium carbonate); SILICATES—CLAY (aluminum silicate), wollastonite (calcium silicate), TALC (magnesium silicate), MICA (aluminum potassium silicate); and OXIDES—silica, alumina.

extender (pigment) a specific group of ACHROMATIC pigments of low REFRACTIVE INDEX (between 1.45 and 1.70) incorporated into a vehicle system whose refractive index is in a range of 1.5 to 1.6.^{58,41}

exterior basecoat a coating applied to the outside of a beverage can to provide both corrosion resistance and as a background for LITHOGRAPHY or PRINTING.^{163,71} (EPA)

exterior finishes coatings which are expected to possess reasonable DURABILITY when exposed to natural WEATHERING.⁷¹ See EXTERIOR PAINTS and VARNISHES.^{71,152}

exterior paints and varnishes material formulated for use in conditions exposed to the weather.^{71,152}

exterior type plywood PLYWOOD BONDED with a fully water-resistant glue.^{153,159,75}

external mix SPRAY EQUIPMENT in which fluid and air join outside of aircap.⁵⁹

external phase of an emulsion synonym for the continuous phase.⁶⁰

external plasticizer postadded PLASTICIZER as opposed to PLASTICIZATION by means of internally combined groups, such as COPOLYMERIZATION.¹⁷⁰ cf. INTERNAL PLASTICIZERS¹⁷⁰

extinction coefficient an older synonym for ABSORPTION COEFFICIENT.^{69,43}

extraction method by which the soluble parts of a substance are separated from the substance by a liquid.^{157,131}

extrusion method whereby heated or unheated material forced through a shaping orifice becomes one continuously formed piece.^{57,151} See COMPACTING and STRAINER.^{38,131}

extrusion mark in EXTRUDED items, a cleft, gash, slit, or notch.³⁸

extrusion moldings MOLDINGS which are made from plastic material by forcing it through a shaped orifice by means of pressure.^{38,57}

exudation the MIGRATION of a substance to the SURFACE, such as RESIN from WOOD, PLASTICIZER from films.^{42,56,154} cf. BLEEDING and SWEATING^{69,42}

It is used as a SOLVENT, mostly in the laboratory. The term "ligroine" should be used in place of "benzine" or "petroleum ether."

lime CALCIUM OXIDE (CaO), or a mixture of calcium oxide and magnesium oxide (MgO); also, loosely, a general term for the various chemical and physical forms of QUICKLIME, HYDRATED LIME, and HYDRAULIC HYDRATED LIME.¹⁴⁴ (ASTM) cf. LIMESTONE^{41,58} See CALCIUM OXIDE.¹⁴⁴

lime blue mixture of ULTRAMARINE and TERRA ALBA.⁴¹
Another type of lime blue is made from METHYLENE BLUE by ADSORPTION ON natural earth.

lime green see GREEN, LIME.^{41,68}

lime putty see PUTTY.^{158,165}

lime red LAKE produced by adsorbing magenta on a natural earth.⁴¹

lime yellow LAKE produced by adsorbing auramine or other yellow DYE stuff on a natural earth.⁴¹

limed rosin commercial CALCIUM RESINATE made by the direct interaction of LIME and ROSIN.^{156,167}

limekiln a furnace used to reduce naturally occurring forms of CALCIUM CARBONATE TO LIME.⁵⁹

limestone see CALCIUM CARBONATE, NATURAL.^{41,58}

limewashing coating with limewash made from HYDRATED LIME or by slaking QUICKLIME, to which tallow is sometimes added.^{71,163} (BSI) Syn: white-wash, whitening

limiting viscosity number see INTRINSIC VISCOSITY.^{130,166}

limonite see IRON OXIDES, NATURAL.⁴¹

line etching a PRINT made up of lines or pigmented areas and lighter spaces free from SHADING.¹⁶⁸

liner see LINING TOOL.⁵⁹

lining fabrics muslin or CANVAS used underneath fine WALLPAPERS to avoid small cracks possibly opening up in a PLASTER wall and showing through.¹⁴⁸

lining paper plain PAPER applied before the WALLPAPER.¹⁴⁸

Assures a smoother surface and better ADHESION.

lining tool (Brit.) A small flat FITCH with a slanting edge, used for painting lines with the help of a rule.⁵⁹ Syn: liner

linkrusta a permanent WALLCOVERING coated with a WOOD FLOUR and LINSEED OIL mixture on a PAPER backing.¹⁴⁸

Linkrusta patterns are molded rather than printed.

linoleic acid C₁₈H₃₂O₂, cis-9, cis-12 octadecadienoic acid.⁶³

A FATTY ACID constituent of LINSEED and other DRYING OILS, where it occurs as a glyceride; mol wt of 280.44, bp of 230°C, iodine value of 181.1.

linolein glyceride of LINOLEIC ACID. It is one of the constituents of LINSEED OIL which induces the DRYING properties.⁶³

linolenate driers certain METAL SALTS of, and SOAPS of, LINSEED FATTY ACIDS.^{67,83}

linolenic acid CH₃CH₂CH=CHCH₂CH=CHCH₂CH=CH(CH₂)₇CO-OH. Triply unsaturated fatty acid component of LINSEED and other DRYING OILS.⁶³

Properties: bp of 230°C/17 mm Hg, an acid value of 201.6, and an iodine value of 273.7.

linoleum and oilcloth varnishes special highly flexible and elastic VARNISHES.^{152,156}

linoleum, floor and wall covering made from oxidized LINSEED OIL or combinations of DRYING OILS, wood flour and/or ground cork, resins, and pigment, rolled out and compressed onto an ASPHALT saturated felt, burlap, or other backing.⁷⁵

Heat, which fuses and sets the oils and resins to form strong binding agents, is applied to the mixture during compression.

linoxyn semisolid, highly oxidized LINSEED OIL; used in the manufacture of LINOLEUM.⁶³

linseed oil DRYING OIL from seeds of the flax plant (*Linum usitatissimum*).⁶³ (PTM)

The oil is refined by treatments which remove water and MUCILAGINOUS material and is then described as refined oil, according to the method of treatment. Further processing produces BOILED OIL, BLOWN OIL, or BODIED OIL. This best known and most widely used oil in the paint industry is characterized by its relatively short DRYING TIME. Its high degree of UNSATURATION, to which its good drying characteristics can be partially ascribed, is due to the presence of large percentages of linolenic and linoleic triglycerides. Many years ago the oil was obtained from seed by mechanical pressure, including both hydraulic presses and later expellers. In recent years the more modern SOLVENT EXTRACTION is used. OILS thus obtained show lower percentages of impurities and better overall quality. Linseed oil responds very readily to a variety of refining techniques and is used in the paint industry both as a drying oil and as an ingredient in a wide array of modified RESINS of many varieties.

ASTM specification for boiled linseed oil is D260; for raw linseed oil, D234.

phthalic anhydride $C_6H_4(CO)_2O$. White, odorless, crystalline FLAKE ACID ANHYDRIDE used in the manufacture of ALKYDS, POLYESTER RESINS, PLASTICIZERS, SOLVENTS, DYES, and INTERMEDIATES.¹⁵⁶

Properties: bp, 284°C; mp, 130°C; sp gr, 1.53; acid value, 758.0.

ASTM test methods for phthalic anhydride include: color in molten state, D3366; content in alkyd resins, D563, D1306; sampling and handling, D3438; specification, D2403.

phthalic anhydride test phthalic anhydride reacts with primary ALCOHOLS when the mixture is refluxed in BENZENE.¹⁵⁷

Secondary alcohols react less readily, usually requiring a reaction temperature of 100-200°C, whereas the tertiary alcohols do not react.

phthalocyanine pigments series of ORGANIC PIGMENTS having as a structural unit four isoindole groups, $(C_6H_4)C_2N$, linked by four nitrogen atoms so as to form a conjugated chain.⁴¹

There are four commercially important modifications, including the basic compound: (1) phthalocyanine (METAL free), $(C_6H_4C_2N)_4N_4$, blue-green; (2) copper phthalocyanine, in which a copper atom is held by secondary valences of the isoindole nitrogen atoms; sp gr, 1.59; (3) chlorinated copper phthalocyanine, green, in which 15 to 16 hydrogen atoms are replaced by chlorine; (4) sulfonated copper phthalocyanine, water-soluble, green, in which two hydrogen atoms are replaced by sulfonic acid, HSO_3 , groups.

ASTM Test Methods D1135 and D3256 cover the analysis of phthalocyanine (phthalo) blue and ASTM D963, its specification.

ASTM Test Method D3256 covers the chemical analysis of phthalocyanine (phthalo) green and ASTM D3021, its specification.

phycocolloid any of several polysaccharide hydrocolloids from brown to red seaweeds.^{139,155} See GUM, NATURAL.^{155,130,167}

physical of, or relating to matter and energy or the sciences dealing with them, especially physics.¹⁴²

physical hazard a substance for which there is valid evidence that it is a combustible liquid, compressed gas, explosive, flammable, an ORGANIC peroxide, an OXIDIZER, PYROPHORIC, unstable (reactive), or water reactive.¹⁷²

PIC test abbreviation for pseudoisochromatic test for defective COLOR vision.^{43,157,69} See PSEUDOISOCROMATIC PLATE TEST.^{43,157,69}

pick see PICKING.¹⁶⁸

pick-up roll (1) in the COIL COATING industry, the roll which revolves within the pan and is partially immersed in the paint. This roll picks up paint from the pan and applies it to the transfer or applicator roll;^{59,70,79,77} (2) spreading device where the

roll for picking up the ADHESIVE runs in a reservoir of adhesive. (ASTM)

picking (1) the adherence of a sheet of PAPER to the plate due to the tack of the INK; (2) the removal of the surface of the paper during printing. It occurs when the pulling FORCE (tack) of the ink is greater than the surface strength of the paper, whether coated or uncoated.¹⁶⁸ See LIFTING.^{42,56,77}

picking up (1) the blending of a coat of freshly applied paint with another over which it is applied;⁵⁴ (2) the joining up of a WET EDGE.⁵⁴ cf. PULLING UP⁴²

pickled pine a gray FINISH which duplicates the effect formerly produced by actually pickling the wood with nitric acid, but now obtained by using a gray STAIN.¹⁴⁸

pickling (1) treatment for the removal of rust and MILL SCALE from STEEL by immersion in an acid solution containing an INHIBITOR. Pickling should be followed by thorough washing and drying before painting; (2) the process of removing paint and VARNISH with an alkaline preparation or strong solvents.¹⁵⁸ (BSI)

picture framing a perimeter thickness of COLOR difference (usually darker) relative to the rest of the painted surface.^{42,56}

This problem can be due to various mechanisms: (a) architectural paints: the greater shear of a BRUSH used around the perimeter of a wall or ceiling compared to the lower shear of a roller used on the rest of the wall or ceiling; (b) industrial finishes: the FLOW of a FINISH during baking resulting in the build-up of the coating on the edge of the SUBSTRATE; (c) roofing: a rectangular pattern of ridges in a membrane over insulation or deck joints. (ASTM); CEMENT-ASBESTOS shingles: (on EXPOSURE fences) the darker color of the coating on the perimeter due to carbonation (from the CO_2 in the air) of the LIME in the shingle causing it to be more neutral compared to the rest of the shingle which is more alkaline and attacks some paints usually causing a lighter COLOR.

pig wrack see CARRAGEEN.^{139,155}

pigging the cleaning out of pipelines, between processes, with a special contoured plug or pig.^{49,131}

The pig is driven down the pipeline by compressed gas fluid or even product to produce a clean line ready for reuse.

pigment finely ground, natural or synthetic, INORGANIC OR ORGANIC, insoluble DISPERSED PARTICLES (POWDER) which, when dispersed in a liquid VEHICLE to make paint, may provide, in addition to COLOR,

Words presented in CAP/SMALL CAPS type indicate that the word is defined in another part of the *Coatings Encyclopedic Dictionary*.

Numerical superscripts classify terms in one or more of the categories listed in the second section of this volume.

many of the essential properties of a paint—OPACITY, HARDNESS, DURABILITY, and CORROSION RESISTANCE.^{41,69}

The term is used to include EXTENDERS, as well as white or color pigments. The distinction between powders which are pigments and those which are DYES is generally considered on the basis of SOLUBILITY—pigments being insoluble and dispersed in the material, dyes being soluble or in solution as used.

ASTM test methods for pigment content of paints and dispersions include: paint/traffic marking material, D4451; pigment pastes in oil, test, D1208; solvent paints, D2371; titanium dioxide slurries, D3926; water-based paints, D3723.

ASTM test methods for general properties and composition of pigments include: bleeding characteristics, D279; acidity/alkalinity, D1208; moisture content, D280 and D1208; volatile content, D4139; water soluble salts content, D2448; lightfastness in artist paints, D4303; oil absorption, Gardner-Coleman method, D281.

ASTM test methods covering pigment particle size include: reporting of characteristics, D1366; coarse particle content, D185; fineness of dispersion paint, D1210; fineness of grind, printing ink, D1316; particle size distribution, D3360; specific gravity (density), D153; tinting strength and color of colored pigments—with a mechanical miller, D387; with a miniature sand mill, D3022; tinting strength of white pigments—visual method, D332; instrumental method, D2745.

Pigment Black 6 (77266) see LAMPBLACK.⁴¹

Pigment Black 7 (77266) see CARBON BLACK.⁴¹

Pigment Black 10 see GRAPHITE.⁴¹

Pigment Black 11 (77499) see BLACK IRON OXIDE.⁴¹

pigment bleeding diffusing of coloring matter from a previously coated surface due to SOLVENT extraction of colorants.^{41,42,56,69}

Pigment Blue 27 (77510) see IRON BLUE.⁴¹

Pigment Blue 28 (77346) see COBALT BLUE.⁴¹

Pigment Blue 29 (77007) see ULTRAMARINE BLUE.⁴¹

Pigment Brown 6 (77499) see BROWN IRON OXIDE PIGMENT.⁴¹

pigment dyes see DYE PIGMENTS.⁴¹

pigment extender see EXTENDER (PIGMENT).⁴¹

Pigment Green 8 (10006) see PIGMENT GREEN B.⁴¹

Pigment Green 10 (12775) see NICKEL AZO YELLOW.⁴¹

Pigment Green 15 (77510/77603) see CHROME GREENS.⁴¹

Pigment Green 17 (77288) see CHROMIUM OXIDE GREEN.⁴¹

Pigment Green 18 (77289) see HYDRATED CHROMIUM OXIDE.⁴¹

Pigment Green B $C_{30}H_{18}N_3O_6FeNa$. Pigment Green 8 (10006). A stable chelate PIGMENT based on nitrosation of 2-naphthol.⁴¹

Good ALKALI RESISTANCE and interior LIGHTFASTNESS; poor ACID RESISTANCE. Density, 1.4-1.58 g/cm³ (11.6-13.1 lb/gal); O.A., 75-100; particle size, 0.01-0.35 μ m.

pigment grind (deprecated) Not a grind, but a DISPERSION of PIGMENT in VEHICLE.⁶⁴

Preferred term is "MILL base."

pigment, metallic see METALLIC PIGMENT.⁴¹

pigment, nonhiding see EXTENDER (PIGMENT).^{41,56}

Pigment Orange 21 (77601) see CHROME ORANGE, LIGHT and DEEP.⁴¹

Pigment Orange 23 (77201) see CADMIUM-MERCURY SULFIDES.⁴¹

pigment paste see PASTE, PIGMENT.⁴¹

Pigment Red 1 (12070) see PARA REDS.⁴¹

Pigment Red 3 (12120) see TOLUIDINE REDS.⁴¹

Pigment Red 4 (12085) see ORTHO-CHLOR-PARANITRANILINE.⁴¹

Pigment Red 6 (12090) see PARA-CHLOR-ORTHONITRANILINE.⁴¹

Pigment Red 38 (21120) see PYRAZOLONE RED.⁴¹

Pigment Red 48 (15865) see BON REDS AND MAROONS; PERMANENT RED 2B.⁴¹

Pigment Red 49 (15630) see LITHOL RED.⁴¹

Pigment Red 53 (15585) see LAKE RED C.⁴¹

Pigment Red 57 (15850) see LITHOL RUBINE.⁴¹

Pigment Red 81 (45160) see RHODAMINE 6G.⁴¹

Pigment Red 83 (58000) see ALIZARIN RED.⁴¹

Pigment Red 101 (77491) see INDIAN RED; IRON OXIDES, SYNTHETIC.⁴¹

Pigment Red 104 (77605) see MOLYBDATE ORANGE.⁴¹

Pigment Red 105 (77578) see RED LEAD.⁴¹